

RS - INT
REGENERATION
Planting
Fp-10 (Payette)

Working Plan

October 1, 1940

PONDEROSA PINE SEEDING-PLANTING EXPERIMENT
IN PHILLIPS CREEK BURN, PAYETTE NATIONAL FOREST

Introduction

Realizing that artificial regeneration of ponderosa pine has not been successful in most instances by either direct seeding or field planting methods in Central Idaho, it is hoped that further experiments along these lines will produce information useful to future artificial forest regeneration projects.

The present study is principally a comparative test of some of the most promising leads that have developed to date involving a few of the factors or techniques that have proven most influential in past studies.

Objects of the Experiment

a. Specific Objects:

1. What is the magnitude of difference between spot establishment and survival of seedlings^{1/} and transplants on a given area?
2. What is the magnitude of difference of establishment and survival between seedlings given no protection against rodents and those screened against rodents during the critical period?
3. To what extent does slope exposure affect seeding and planting survival?
4. How can adequate survival of seedlings and transplants be obtained, not on choicest sites, but on sites comparable to those actually in need of forest regeneration (i.e. burned areas)?

Experimental Procedure

- a. Location: This experiment will be laid out within the boundaries of the Phillips Creek Burn (1939), above Banks in Payette River Canyon. It will be desirable to select a part of the burned area that is now being cut over, thus reducing to a great extent the hazard of snags falling on the plots.
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^{1/} The term "seedlings" is used here to designate those resulting from direct seeding, as distinct from planted transplants.

b. General Postulations: In view of the fact that the greatest need for forest planting in Central Idaho seems to be in burned over areas, it is felt that this experiment, in order to produce the most beneficial information, should be conducted amid conditions most nearly representative of actual large scale forest planting conditions. The burned area above Banks is large enough to meet these requisites.

Past experiments have indicated strongly that planting or seeding on a fresh burn gives greater success than on an old burn, but the Station has conducted no direct comparative tests of seeding and planting on new burns. Seeding-planting tests on old burns have yielded inconclusive comparisons, as survival of both seedlings and transplants was very poor in the recent drought years. There is a general indication that direct seeding may succeed on certain sites where transplants fail if the seed and young seedlings can be given protection from rodents.

Although the Phillips Creek Burn is one year old it would seem that conditions are still "fresh" enough to indicate what would result on a strictly recent burn. Brush on the area is somewhat past the incipient stage, but is not so far along as to materially alter the results of the experiment.

This area, besides being in need of reforestation, will lend itself to a contemplated experiment dealing with control of rodent damage to seedlings by methods other than screening.

c. Experimental Design: This experiment involves the following variables:

1. Direct seeding.
 - a. Seeding spots with screen cones.
 - b. Seeding spots without screen cones.
2. Planting (2-1 Stock)
3. Aspect
 - a. Northerly
 - b. Southerly

It is planned to lay out 3 plots to each aspect, 6 rows each of the first two variables in every plot and 10 spots per row. Spots will be 5 feet apart in rows 8 feet apart.

Spot preparation will include scalping or at least thorough breaking of sod over a space large enough to provide a spot 18 inches in diameter.

It seems that an 8 foot row spacing interval will be desirable to allow for various clearing, weeding, or cultivating treatments that may subsequently be tested on certain rows. Since the contemplated location will furnish sufficient area, there seems to be no reason for not using a spacing interval large enough to eliminate all cross-effects between rows. The specific plan for subsequent treatments will be devised if initial establishment is sufficient to warrant it.

A reconnaissance of the proposed area will be made during the fall of 1940. Plot locations will be determined and boundaries laid out.

Direct seeding is also planned at that time, but planting will not be done until the spring of 1941.

Unprotected seeding spots will be marked with kindling wood stakes in order that the spots can be located for inspection.

d. Analysis of Results: The basis of comparison between seeding and planting will be rows; i.e., the percentage of spot survival of seeded rows as against percentage of spot survival of planted rows. (For certain purposes it will be desired to compute percentages of germination or of survival or of deaths by given causes on the basis of numbers of individual seedlings in the seeded spots; if statistical analysis is required for interpretation the general form will be similar to that outlined for spot survival.) In past experiments unprotected seed spots have yielded very low survival figures. Thus in analyzing the results of this experiment, unless unprotected seedings show up better than in the past, comparison will be between protected seeding and planting on the two aspects.

For each aspect, an analysis of variance may be made as indicated in the following table, using "establishment" or survival numbers or percentages for any date of inspection. Since the variable of aspect cannot be randomized, it is not proper to include it in the same analysis. Probably the simplest way to determine the significance of its effects is to consider only one method of treatment at a time and apply the "t" test to survival figures for rows on the two aspects.

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square
Treatment (Method)	1		
Between Plots	2		
Between Rows	5		
Error	27		
Total	35		

If the establishment of seedlings on unprotected seed spots should happen to be so good as to require statistical examination of results to compare with unprotected spots, the same form of a table and same degrees of freedom would apply, the "treatment" being screen protection instead of method of regeneration.

Appendix

a. Source of Seed: Boise Basin with an altitude of 4000-5000 feet is the source of seed for seeding spots in the Phillips Creek burned area. This seed was gathered in 1939 by the CCC.

b. Source of Planting Stock: It is thought that, because of the generally good appearance of the McCall Nursery stock and the successful results

of Payette Forest plantings of this stock, transplants for the experiment would be obtained, if possible, from the McCall Nursery. In addition, this nursery is closer to the planting site than any other, a fact that will reduce transportation of the stock to a minimum.

c. Technique of Seeding: As previously stated, seeding and planting spots will consist of a scalped area 18" in diameter. The soil in the exact place of seeding will be cultivated. Then a thimbleful of seed (15 \pm 2 seed) will be sown to a depth of 1/2", the covering soil gently patted down over the seed. In those cases where cones are to be used, the cones will be firmly set so as to resist any minor shock. (Screen extending 1 inch or more down into the soil).

d. Technique of Planting: The planting hole will be dug with a shovel. These holes will be large enough and deep enough to accomodate the roots without crowding. The individual plant is to be set in the hole with the roots spread in a natural position and so as the seedling ground line will be level with the top of the soil.

As the soil is being replaced, it will be tamped evenly around the roots and up to the top layer. On steep slopes both seeding and planting spots will be cleared to make a shelf-like spot.

e. Collection of Data: Plots will be checked in the spring of 1941, about June 1, summer about July 30, and fall about October 15. At each inspection seedlings will be checked for number surviving, number dead, and cause of deaths within each spot. Planting will be checked and recorded as living and growing, living, or dead, with cause of death being listed. An appropriate list of symbols for cause of death or injury will be made up conforming as nearly as possible to those already in use. At the fall inspection heights of transplants will be recorded to the nearest tenth of an inch.

Suitable forms for collection of data are attached to this report.

f. Timing of Operation: Because of the relatively small scale of the experiment no timing of the operation will be kept.

g. Responsibility, time, cost, etc.:

(1). Asst. Silviculturist, E. L. Mowat, and Junior Field Asst., H. L. Ketchie, will be responsible for establishment of the experiment.

(2). Material and labor needed:

a. Material:

1.- Tape, 100 feet

1 - Compass F. S. standard with bell and socket joint

1 - Jacobs staff

1 - Ax - small hand

216 - stakes- numbered in groups of 1-18 (12 groups)

1 - Holder - tatum

54 - Sheets paper - compilation

1 - Keel; black lumber

2 - Sash cords - 60 ft. long marked at 5' intervals

2 - Buckets, canvas
360 - Seedlings (2-1) ponderosa pine
2 - Mattocks, baby
2 - Mattocks, regular
2 - Shovels, baby
2 - Thimbles, seeding
2 - Lbs. seed, ponderosa pine
360 - Stakes, kindling wood

b. Labor

- (1) Initial establishment (Fall 1940)
 - 2 - Technical men - 2 days - 4 man days - plot boundaries.
 - 2 - Technical men - 2 days - 4 man days - seeding and planting.
 - 4 - laborers - 2 days - 8 man days - scalping.
- (2) Initial establishment (Spring 1941)
 - 2 - Technical men - 2 days - 4 man days - inspection and planting.
 - 4 - Laborers ^{Seasonal checks (1941)} - 2 days - 8 man days - scalping
- (3) 2 - Technical men - 3 days - 6 man days
- (4) Establishment reports
 - 1 - Technical man - 2 days - 2 man days

Henry L. Ketchie
HENRY L. KETCHIE
Jr. Field Asst.

Approved:

Edwin L. Mowat
EDWIN L. MOWAT
Project Leader

RWB.
REED W. BAILEY
Director

Order of Rows for Payette Planting
Combination Seeding and Planting Experiment

South Exposure			North Exposure				
Plots			Plots				
Variable	1	2	3	Variable	4	5	6
Planting	1	16	12	Planting	3	3	14
	10	1	8		7	7	15
	5	4	16		15	10	11
	16	8	5		16	2	6
	7	12	15		4	8	18
	17	17	17		17	11	13
Seeding with cones	6	13	3	Seeding with cones	18	4	12
	15	14	4		14	14	1
	2	9	10		9	9	7
	18	2	13		8	6	3
	11	11	11		1	17	9
	14	15	1		10	18	2
Seeding without cones	13	18	18	Seeding without cones	13	15	8
	12	5	2		11	1	5
	3	3	7		12	16	10
	8	10	9		2	12	16
	9	7	6		5	13	4
	4	6	14		6	5	17